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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/669,081

09/23/2003

Jay Jie Lai

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1863

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7590

03/16/2005

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EXAMINER

ECKERT II, GEORGE C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/669,081	Applicant(s) LAI ET AL.	
	Examiner George C. Eckert II	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2004.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/15/03</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment dated December 27, 2004 in which claims 25 and 26 were canceled has been entered. The restriction requirement (mailed November 30, 2004) is moot.

### ***Drawings***

2. The drawings are objected to because, in figures 7A, 8, 9-12 and 14, there is shown a line between the top surfaces of metal contacts 700 implying that the space between the contacts is filled. However, the specification teaches and later figures show that the space is not filled (paras. 0041-42; fig. 11 shows formation of nitride layer 1100 between the contacts and directly on top of layer 804). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 4-11 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,686,580 to Glenn et al. Glenn teaches in figure 6 an apparatus comprising:

an optoelectronic device 106 formed on a front side of an optoelectronic chip 102; and  
at least one electrical contact 218 on a backside of the optoelectronic chip, wherein the electrical contact is electrically coupled to the optoelectronic device 106 (by connections 216, 215, 104) through a substrate 102 of the optoelectronic chip.

Regarding claim 5, Glenn teaches that the optoelectronic chip interfaces an optical system 560C with an electrical system (not shown, col. 3 lines 60-62, a printed circuit board inherently has an electrical system). Regarding claim 6, Glenn teaches that the optoelectronic device has an aperture 502 for communication with an optical system 560C, and the aperture is proximal the optical system (as shown in figure 6). Regarding claims 7-11, Glenn teaches that the optoelectronic chip is formed above an electrical system by means of solder bump connections 218 such that the backside of the chip is proximal the electrical system. The board (not shown) on which the optoelectronic chip is mounted reads on a carrier or chip as they are merely labels which do not structurally distinguish over Glenn.

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4. Claims 12-18, 23 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,614,103 to Durocher et al. Regarding claims 12, 15 and 23, Durocher teaches in figure 13 an apparatus comprising:

an array of optoelectronic devices 59 formed on a front side of a chip 41;

a corresponding array of electrical contacts 47 on a backside of the chip, wherein the electrical contacts are electrically coupled to the corresponding optoelectronic devices by respective vias 51 through a substrate of the chip (fig. 5, col. 5, line 6).

Regarding claims 13-15, 17, 23 and 24, Durocher teach that the optoelectronic devices may be photo detectors, light emitting devices (LEDs) or laser diodes which includes VCSELs (col. 9, lines 36-42). Regarding claim 16, Durocher teaches that the optoelectronic element may comprise any of a variety of materials including GaAs (col. 7, lines 34-37). Regarding claim 18, this claim cites no more than an intended use of the device taught by Durocher.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,348,682 to Lee in view of 6,614,103 to Durocher et al. Lee teaches in figure 4 the coupling of a photodiode 336 to a transimpedance amplifier but does not teach the configuration of the photodiode to a chip, or the chip to the amplifier. Durocher teaches in figure 13 the formation of

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optoelectronic device 59 which may comprise photodiodes, the photodiodes mounted on a chip 41 having electrical contacts 47 on its backside, the contacts being connected to the device 59, and that the electrical contacts 47 are connected to the external circuit, in this case a transimpedance amplifier.

Lee and Durocher are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the circuit of Lee using the photodiode arrangement as taught by Durocher. The motivation for doing so, as is taught by Durocher, is that such an arrangement and use of materials allows the optoelectronic device to be formed into a variety of shapes as may be needed by each design. Therefore, it would have been obvious to combine Lee and Durocher for claims 1-3 and 18-22.

Regarding claim 2, Durocher teaches the use of III-V materials to form a optoelectronic device. Regarding claim 3, Durocher teaches vias 51 (fig. 5) which couple the contacts 47 to the optoelectronic device 59.

Regarding claims 19-22, Durocher taught the device of claim 15 but did not expressly teach the device was further bumped connected or coupled to a chip carrier or electronic receiver. However, these limitations are considered obvious over Durocher, in light of Lee. It is obvious that the device of Durocher, when using photodiodes as the optoelectronic devices 59, must be coupled to an external device, be it a chip carrier or other electronic receiver, such that use may be made of the light signal received by element 59. Durocher also teaches that the top of the photodiode 59 is exposed above the chip 41, and would also be exposed above any carrier on which the chip is placed. Finally, Lee makes obvious the use of a transimpedance amplifier to be coupled to a photodiode.


*Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional cited art teaches various arrangements of photodiodes or other optoelectronic devices formed above a chip, wherein the chip has contacts on the bottom side, which contacts connect through vias in the chip to the optoelectronic device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Eckert II whose telephone number is (571) 272-1728.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**GEORGE ECKERT**  
**PRIMARY EXAMINER**